

## Attachment IV

### Examples of Calculating Number Of Violations

The originally proposed regulation did not contain a methodology for determining when a violation of the fleet-average requirements occurred. For example, if a vessel fleet fell short of the minimum visit requirement for shore power for a quarter, was the fleet in violation for the whole quarter (i.e., 90 days)? Would there be a difference in potential fines for barely missing the requirement(s) or not even coming close?

At the December 2007 Board hearing, staff recommended that a methodology for determining the number of violations for noncompliance be included in the regulation. To that end, staff has proposed modifications to the violations section in the At-Berth Ocean-Going Vessels Regulation (section (h)(2)). Staff has included violation formulas that a fleet will use to determine the number of violations that may have occurred during the applicable compliance period.

Staff developed formulas for five violations scenarios: 1) fleets failing to achieve the baseline power reduction requirements; 2) fleets failing to achieve the limited engine use visits percentages; 3) fleets failing to achieve both of these requirements; 4) fleets failing to achieve the applicable emission reduction percentages; and 5) shore-power equipped ships failing to use shore power during a visit to a berth that had compatible shore power.

The formulas in the regulation are:

- Number of reduced onboard power violations =  $\text{MW-Hr shortfall} / 1.8$
- Number of visits violations =  $\text{visits} \times \text{MW-Hr per visit} / 1.8$
- Number of both reduced onboard power and visits violations =  $\text{MW-Hr shortfall for the applicable quarter} / 1.2$
- Number of emission reduction violations =  $[\text{NOx} + \text{PM shortfall (pounds)}] / 57$

The intent of the formulas is to provide an appropriate and effective disincentive for noncompliance with the regulatory requirements. The numbers in the denominators—1.8, 1.2, and 57—were mathematically determined to achieve the effective economic disincentive. They have no other mathematical significance, such as to conversion factors, etc. Cost for compliance was based upon the cost of the electricity and labor for a ship to use shore power for a typical vessel visit.

## Example Calculations for Determining Number of Violations

The following calculations illustrate the use of the formulas to determine the number of violations for three situations: 1) a fleet is complying with the Reduced Power Option, but the fleet does not satisfy the required number of visits in a quarter; 2) a fleet is complying with the Reduced Power Option, but the fleet does not satisfy both the visits and power reduction criteria; and 3) a fleet is complying with the Emission Reduction Option, but the fleet does not comply with the required reduction in emissions.

### Example Fleet Information

Fleet: Four container ships that made a total of 10 visits to a port last quarter

Average berthing time: 20 hours

Average power requirement: 1.6 megawatts

Total power requirements: 320 MW-Hr of power (1.6 MW x 20 hours x 10 ship visits), or 32 MW-hr per visit.

Total hotelling emissions for quarter: 5 tons of NO<sub>x</sub> and 0.15 tons of PM

#### 1. Visits Shortfall for fleet complying with Reduced Power Option

For a fleet complying with the 2014 requirements of the Reduced Power Option, the fleet would have to turn off their auxiliary engines (and presumably receive shore power) for 50 percent of their visits. Furthermore, the fleet would have to reduce its onboard electrical generation by 50 percent.

For this example, at the end of the quarter, the fleet satisfied the power reduction requirement, but came up short on the visit criteria, using shore power for four visits instead of five.

The potential number of violations for being one visit short of the visit criteria is calculated with the following formula:

$$\begin{aligned}\text{Violations} &= (\text{visit shortfall}) \times \text{MW-Hr} / 1.8 \\ &= 1 \text{ visit} \times 32 \text{ MW-Hr} / 1.8. \\ &= \mathbf{17.8 \text{ violations}}\end{aligned}$$

## 2. Visits and Power Shortfall for fleet complying with Reduced Power Option

For this example, at the end of the quarter, the vessel fleet came up short on both the visit criteria, missing one visit, and the reduced power generation criteria, falling 32 MW-hrs short.

The potential number of violations for this situation is calculated with the following formula:

$$\begin{aligned}\text{Violations} &= \text{MW-Hr shortfall} / 1.2 \\ &= 32 \text{ MW-Hr} / 1.2 \\ &= \mathbf{26.7 \text{ violations}}\end{aligned}$$

## 3. Emission Shortfall for fleet complying with Emission Reduction Option

For a fleet complying with the 2014 requirements of the Emission Reduction Option, the fleet would need to reduce the emissions of the fleet by 50 percent. As identified above, the fleet emitted 5 tons of NOx emissions and 0.15 tons of PM emissions for the quarter; therefore, the emissions must be reduced by 2.5 tons of NOx emissions and 0.075 tons of PM emissions.

If the fleet is 20 percent short of this goal, the potential violations for this situation are calculated with the following formula:

$$\begin{aligned}\text{Violations} &= (\text{NOx} + \text{PM shortfall}) / 57 \\ &= ((0.5 \text{ tons} \times 2000 \text{ lb/ton NOx}) + (0.015 \text{ tons} \times 2000 \text{ lb/ton PM})) / 57 \\ &= \mathbf{18 \text{ violations.}}\end{aligned}$$

The Health and Safety Code, commencing with section 42400, addresses the potential fines associated with noncompliance. The penalties may be criminal or civil and range from \$1,000 per violation to \$100,000 per violation. The actual penalty amount depends on several factors, among them the extent of harm caused by the violation, the nature and persistence of the violation, and the frequency of past violations.